UNITED STATES DEPARTMENT OF AGRICULTURE
OFFICE OF PUBLIC ROADS AND RURAL ENGINEERING
WASHINGTON, D. C.

FIELD LETTER FOR APRIL No. 15.

May 1, 1916.

DIVISION OF CONSTRUCTION
Vernon M. Peirce, Chief.

Projects:

General

R. E. Toms, S.H.E., cooperating with the Kentucky State Department of Public Roads, has moved his headquarters from Mt. Sterling to Corbin, Kentucky.

George D. Marshall, S.R.C., during the entire month of April has been collecting statistical data for the Division of Economics in Mississippi and Louisiana.

The work on the sand-clay, top soil, and gravel bulletin has been turned over to C. H. Moorefield for completion, since W. J. R. Weir's resignation from the Office to take up work in Florida as a road contractor.

Advice and Inspection

A. S. Brainard, S.H.E., formerly with the Division of Road Economics, has been temporarily transferred to this Division and has been assigned to cooperate with the county authorities of Monroe County, Indiana, in the construction and maintenance of county roads. His headquarters will be at Bloomington.

R. H. Harrison, J.H.E., completed the Texas Post Road April 4 and has been assigned to cooperate with the county authorities of Dickens County, Texas, in improving an east and west cross-county road with headquarters at Spur.

W. H. Lynch, S.H.E., from April 10 to 15 inspected road construction in Sacramento, Alameda, Contra Costa, and San Joaquin Counties, California, and from April 17 to 29 attended a court trial at Columbiana, Alabama. He then returned to Reno, Nevada, to continue his work of cooperation with the county authorities in improving the road from Reno to Carson City.

Object-Lesson Roads

F. A. Davis, J.H.E., completed a sand-clay object-lesson road in Burleson County, Texas, April 29, and has been assigned to cooperate with the county authorities of Brooks County, Texas, in planning the improvement of about 25 miles of earth roads.

The work of the construction of the Russell Experimental Road in Alexandria County, Virginia, and the Mt. Vernon Experimental Road in Fairfax County, Virginia, was resumed April 10, with L. I. Hewes, S.H.E., in charge, assisted by S. L. Taylor J.H.E., A. S. Hathaway, J.H.E., and F. R. Lyons, J.H.E.

L. L. Winans, J.H.E., who went to Kokomo, Indiana, to cooperate with the County Highway Superintendent of Howard County, found it impossible to satisfactorily cooperate with the county authorities, and has been assigned to Pottawatomie County, Oklahoma, to assist the county authorities in improving a north and south cross-county road. State convicts are being used on the work. His headquarters are at Shawnee.

County Systems

B. H. Burrell, S.H.E., completed his report recommending a county system for Escambia County, Florida, April 10, and has been assigned to prepare a similar report for Bay County, Florida, with headquarters at Panama City.

E. O. Hathaway, S.H.E., has been assigned to Yazoo City, Mississippi, to plan a system of roads for Yazoo County, as a preparation for a county bond issue of considerable magnitude.

James C. Wonders, S.H.E., completed an inspection of the roads of Clay County, Missouri, and the preparation of a report for a county system April 7, and was given a similar assignment in Johnson County, Missouri. The Johnson County assignment was completed April 29 and Mr. Wonders was assigned to cooperate with the county authorities of Holt County, Nebraska, in the improvement of an earth road from O'Neill to Chambers.

H. H. Lotter, S.H.E., completed the preparation of a report for a county system for Tallahatchie County, April 21, and has been assigned to prepare a report for a county system for Sunflower County, Mississippi.

Post Roads

The work of construction on the Iowa Post Road began April 10, with C. H. Sweetser, S.H.E., in charge, assisted by A. L. Hooper, J.H.E.

DIVISION OF MAINTENANCE
E. W. James, Chief.

Projects:

Advice, Inspection, and Lectures.

Geo. C. Scales, S.H.E., addressed the County Commissioners of Wilkes County at Washington, Georgia, on April 6.

Mr. James inspected the Cary Street Road in Henrico County, Virginia, on April 8, for the purpose of determining the cause of incipient failure and of suggesting suitable method for maintaining the road.

Mr. James attended a meeting of the North Carolina State Highway Commission at Raleigh on the 10th to confer with the Chief Engineer and complete arrangements for inspecting the Central Highway in North Carolina.

On April 15, he inspected the Durham-Chapel Hill Road in Durham County, N. C., for the purpose of suggesting a method of maintaining the road for about eighteen months, at which time it is expected the road will be reconstructed on much more elaborate lines as a boulevard from Durham to the State University.

D. H. Winslow, S.R.C., appeared before the Board of Supervisors at Boydton, Virginia, in Mecklenburg County, in connection with the continuation of maintenance supervision on the Washington-Atlanta Highway in that county.

V. E. Towles, H.E.) reported for duty on April 21 and proceeded to Benson, N. C., where he will resume his duties in connection with the Washington-Atlanta Highway.

L. L. Winans, J.H.E., has been transferred to the Division of Construction, because cooperation in the maintenance of Howard County roads in Indiana became impracticable.

WASHINGTON-ATLANTA HIGHWAY

From March 30 to April 4, Mr. James visited points in Georgia, in company with G. C. Scales, S.H.E., for the purpose of discussing with the local officials the selection of one route from Augusta to Atlanta. It has become necessary to discontinue operating two separate roads in Georgia, and the selection of one or the other has been left with the counties concerned. That route will be finally accepted by the Office which cooperates most satisfactorily on the conditions set by the Office.

W. L. Spoon and D. H. Winslow were absent from their sections on the Washington-Atlanta Highway during a part of the month while they were accompanying Mr. James and representatives of the North Carolina State Highway Commission on the inspection trip of the Central Highway.

Considerable improvement along the Washington-Atlanta Highway is contemplated by several counties. Wake County, North Carolina, has voted to build 1¼ miles of Warrenite at an approximate cost of $15,000, extending from the Raleigh City Limits on the Leesville Road.

Johnston County, N. C., has contracted to scrape and paint all iron bridges on the Washington-Atlanta Highway. Clayton Township has begun planting shade trees on the right-of-way and in Granville County preparation has been made to extend the relocation and new construction south of Stem.

In Wilkes County, Georgia, a gang of 40 convicts will be placed on the Highway for four or five months during the present season. In Oglethorpe County the construction of an unimproved section of the road will be started early in May. Judge Williams of Monroe will put the entire county force on the road in Walton County at once. Engineer Stanley of the Georgia Prison Commission will relocate several miles in Walton County during the latter part of this month, preparatory to new constructi

Professor Slack of the University of Georgia and a party of students will surve and relocate five miles in Oglethorpe and Wilkes Counties, in preparation for the work of construction.

Professor Strahn of the University of Georgia will provide plans and supervise the letting of contracts for the new steel bridge over the Little River between McDuffie and Wilkes Counties.

Central Highway

In cooperation with the State Highway Commission of North Carolina, this Office will assume maintenance supervision of the Central Highway in that State from Morehead City to the Burke County line. For the purpose of making the necessary inspection and estimates and to meet the county commissioners in the various counties along the route, a trip was made during April from Morehead City nearly to the Tennessee line by representatives of this Office and the State Highway Commission.

The road covered by the applications is almost continuous from Morehead City to Hickory and though the mileage is not yet definitely known, it will approximate 432.1 miles, of which practically 400 miles will be under supervision.

Tentative plans are to place two engineers on the Central Highway - one to work west of Durham and one east; the man covering the eastern section will also cover the Washington-Atlanta Highway north of Durham.

Field Experiments

On April 8 and 10, traffic census observations were begun on the Falls and Mt. Vernon Avenue and Russell Roads. These observations will be continued on the French system indefinitely during the course of the present experiments. Fifteen hundred gallons of Tarvia cold-patching material have been delivered for use on the experimental roads. Twenty-five hundred gallons of bitumen have been received for seal coat on sections 17 to 20 inclusive of the Mt. Vernon Avenue Road, and the work of resealing will be begun early in May.

On April 27, Mr. James made a thorough inspection of the Falls Road, preparatory to ordering the necessary bitumens and top-dressing for retreating those sections in need of it.

Cost Data

Cooperation with local officials who will furnish monthly reports on maintenance charges against certain selected sections of improved road under their supervision, has been extended during the past month to Berrien County, Michigan, and Atlantic County, New Jersey, where George W. Larkworthy and Japhet Price, respectively, will act as collaborators.

DIVISION OF NATIONAL PARK AND FOREST ROADS
T. W. Allen, Chief.

Projects:

National Forests

Field

District 2, A. E. Palen, in charge.

The ranger camp on rock work in Jarre Canon on the Sedalia-Decker Springs Road closed April 5, the rangers returning to their districts. The equipment except the drilling machine and the supervision was transferred to the Monument Nursery Road. This work was opened last fall and 76 of the 110 stations were graded. Two bridges were built and all culverts installed. On account of the

od moisture content this spring, the ground being a sandy soil with a sort of cemented sandstone sub-soil, the finishing work and the remainder of the grading will be done much better and at about 60 per cent of the unit cost of the work of last fall. The present work, however, is often interrupted by rain and snow.

Systematized maintenance for the season was established during the latter part of March and the first of April on the Cochetopa Pass, Deadwood-Hot Springs, and Sedalia-Decker Springs Roads.

Two survey parties were started into the field the first part of April, one on location surveys and the other on reconnaissance surveys. Location surveys are under way for the Bear Creek-Fuller R. S. Road, near Salida, Colorado, and reconnaissance surveys for the Pueblo-Beulah-Westcliffe and the Mosca Pass Roads.

Office

During the month the drafting was completed on the detailed construction plans of the Nederland-ward (4 miles), Crested Butte Somerset (8 miles), Wind Cave (2 miles), and Sunday Gulch (2 miles) projects. Drafting on plans and cross sections for seven miles of preliminary surveys on the Platte Canon Project were also completed. These plans are now undergoing revision and additions, and after field inspection they will be in final form. All of these projects except one are being planned for construction in the 1917 season. Construction on a portion of the Sedalia-Decker Springs Road will begin this season. The plans are being rushed and will be inspected on the ground during the coming week.

Committee work on the several committees for road studies, plans, and procedure are now practically completed, except for the drafting and clerical work that these outlines will involve.

District 4. A. E. Palen, in charge.

Upon the Payette River Road, Idaho, the 1200-foot section of rock excavation between the Oxbow and Deadwood Bridge has been completed and considerable maintenance work has been done between Gallager's and the Oxbow, a 10-mile section. The construction work upon this road in the Payette Forest is now practically completed. There remains a 3-mile section from the Deadwood Bridge to Lowman in the Boise Forest to be constructed. This has been surveyed and cross-sectioned, and an allotment of $2,000 made to complete this section this year. The road will then be opened to all traffic from Banks, the Railroad point, to Lowman, a distance of 42 miles, and connect with the State Road from Idaho City to Lowman.

Upon the Secret Pass Road, Nevada, work has progressed on the short remaining section of heavy rock excavation and retaining walls; a crew of eight men and the compressor outfit being employed. It is expected to complete this road in May and transfer the outfit to the Ephraim-Orangeville project in Emery County, Utah.

Upon the Teton Pass Road, Wyoming, a construction allotment of $2,500 is now available to which will be added an approved allotment of $6,000 from the 1917 10 per cent fund when available. It is expected to complete the construction of the 3 miles of new location west of the summit, and the 2 miles east of the summit this season. Owing to the great amount of snow and high altitude it is not probable that construction work can be started before June.

Upon the Ephraim-Orangeville Road, Utah, 3000 feet of heavy grading have been completed during the month in Straight Canyon, and 2 miles improved outside the Forest in Emery County. In San Pete County, one construction camp has been established and construction work is progressing east and west from the west Forest boundary. Another camp will be started about 2 miles within the boundary. $14,000 is now available of State and local funds in the two Counties for cooperation upon this project under the supervision of the Forest Service.

Upon the Salina-Emery Road, Utah, a section of 16 miles in the Fishlake Forest west of the Summit has been recrowned and dragged, the beginning of this season's maintenance work upon this road. Sevier and San Pete Counties have made allotments for constructing about 12 miles of the eastern section of the road, including two new timber bridges of 40 and 60-foot spans, upon a new location which affords better grades and material and a superior route. The total length of this road is 55 miles, 32 miles within the Forest.

Upon the Ryan-Big Spring Road, in Arizona, a small crew has been doing repair work upon a 6-mile section, for which an allotment of $700 was made.

Two survey parties are employed upon the Ephraim-Orangeville Road, making final location and cross-sectioning for construction.

In company with Mr. Allen, two of the State Highway Commissioners, and the County Commissioners an examination was made of the Ephraim-Orangeville construction work and location, and of the Salina-Emery Road.

There have been a few storms during the month, but in general the weather has been very favorable.

District 5. C. C. Morris, in charge.

Trinity River Road: The organizing of the construction force for this job was continued so that at the end of the month there were 35 men and 8 teams at work. Supplies and equipment were purchased and delivered. Items purchased were a Little Western Grader, Western drags, Western drag scrapers, plows, and an Ingersoll-Rand Air Compressor plant.

Laguna Road: The design of this project was continued. A cost estimate was arrived at and reported to the Forester with a request for an allotment. Plans will be ready for forwarding about the last of May.

During the month the Forester approved an allotment of $5,000 for the beginning of work on the Salmon River Road on the Klamath National Forest, an allotment of $500 for the cooperative construction of a suspension bridge at Hyampom, Trinity National Forest, and an allotment of $5,000 for emergency repairs of flood damages on the Cleveland National Forest.

District No. 6. B. J. Finch, in charge.

During the month of April the office work which has been done in District 6 has been on the plans for the Loup Loup Road in the Okanogan National Forest (survey of which was made in July, 1915), the completion and checking of the annual cumulative report, and some work on the preparation of a sheet of standard details for the

plans to be made during the coming year. On the Loup Loup Road plans the grade line and center line have been established, the quantities computed, and plans and estimate completed. Tracing of the plans is now going on and will probably be completed by the first of May.

Considerable work has been done in the office, in connection with the annual cumulative report, in bringing balances on 10 per cent road projects to agree in the various offices. Up until this time no accurate check has been maintained between the offices of the Forest Supervisors and the District Fiscal Agent, but from this time on it will be possible to maintain a constant check between these offices.

Construction work has been confined to the Elk Creek Road in the Umpqua National Forest, where the same force has been maintained as during the previous month. The work which has been done has been mostly in the way of finishing sections of the road which were begun during the winter months and on which the mud made it impracticable to make a finished section.

County Work

Skamania County Work. J. T. Schuyler, S.H.E., in charge.

The work on the Stevenson-Collins Road does not show much progress for the past month as several of the station gangs have been doing finishing work on their sections, and the contractor has been waiting for equipment which he expects to use on the construction of the uncompleted sections. The field parties have taken the final sections of the completed work and have been working them up for the final estimate.

Work on the Mill A-Underwood Road was begun on April 1. The contractor has a force of 20 men and 30 teams at work and expects to have a steam shovel and 30 more men in a few days. A station gang of 20 men are also at work on a section one mile in length. The field party have the center line staked and are now at work setting grade stakes.

Bids were received on the Clarke County Line-Cascades Road from four different contractors, and were as follows:

Bids submitted on West End Section. Skamania Highway		General Construction Co.		Porter Brothers		Federal Construction Co.		T. H. Cochran and Sons	
Item	Amount	Unit Price	Amt.	Unit Price	Amt.	Unit Price	Amt.	Unit Price	Amt.
			$		$		$		$
Clearing	75 acres	$70	5250	$50	3750	$80	6000	$60	4500
Earth Excavation	146,000 cu. yds.	25¢	36500	20¢	29200	33¢	47180	23¢	33580
Rock "	6,000 " "	75¢	4500	75¢	4500	90¢	5400	90¢	5400
Loose rock excava.	8,000 " "	40¢	3200	38¢	3040	40¢	3200	45¢	3600
Rock fill hand placed	50 " "	$2	100	$1	50	$1	50	$1.50	75
2nd. class gravel concrete	350 cu.yds.	$10	3500	$7	2450	$15	5250	$8	2800
Expanded metal in place	2150 sq.ft.	12¢	258	10¢	215	15¢	322.50	8¢	172
Cobble paving in place	200 sq.yds.	60¢	120	$1	200	$1	200	75¢	150
Wood guard rail in place	9300 lin.ft.	30¢	2790	20¢	1860	30¢	2790	15¢	1395
3rd class masonry dry in place	620 cu.yds.	$3.50	2170	$2	1240	$3	1860	$2	1240
Timber and plank in place	40 M.bd.ft.	$26	1040	$24	960	$22	880	$30	1200
Overhaul per 100 feet	25,000 aver. Station times cu.yds.	2¢	500	2¢	500	1¢	250	2¢	500
Loose stone for drains	75 " "	$1	75	$1	75	$2	150	$1	75
Placing corr. iron pipe 12"	3000 lin.ft.	20¢	600	20¢	500	30¢	900	15¢	450
" " " " 18"	700 " "	25¢	175	20¢	600	35¢	245	15¢	105
" " " " 24"	900 " "	35¢	315	20¢	140	40¢	360	25¢	225
Log cribbing	600 " "	20¢	120	20¢	120	25¢	150	$2	1200
Porous tile drain	1000 " "	20¢	200	15¢	150	15¢	150	35¢	350
Truss Bridges, 60-ft.	2	$420	840	$400	800	$480	960	$450	900
" " 40-ft.	2	280	560	300	600	340	680	375	750
" " 30-ft.	5	150	750	200	1000	275	1350	220	1100
Grubbing	20 acres	150	3000	75	1500	80	1600	150	3000
Rubble masonry	300 cu.yds.	6	1800	4	1200	$4.50	1350	$3.50	1050
Rip Rap	300 " "	2	600	1	300	$2	600	$2.50	750
			$ 68963		$ 54630		$ 81877.50		$ 64567

The contract was awarded to the lowest bidders, Porter Brothers of Portland, Oregon. They expect to start the work about May 1st. The center line has been staked out and the field parties are now setting grade stakes.

Franklin County, Idaho, Work. T. C. Peterson, in charge.

T. C. Peterson remained in the office at Ogden, Utah, tracing road plans of the Strawberry Valley, Utah, Survey, until April 10th. Then he was transferred to Preston, Franklin County, Idaho, where a road survey is being made from Preston to Dayton, Idaho, a distance of about seven miles. The present road has a maximum grade of about 10 per cent. The road is very sandy in places. The relocated road will have a maximum grade of 4 per cent. Gravel and clay will be placed on the road where required to make a firm road bed and the whole will be surfaced with oil shale.

Oregon State Road, Crater Lake National Park. J. W. Ball, in charge.

Work on the survey of the Crater Lake-Medford Road in the Crater Lake National Park has been delayed because of Mr. Ball's illness.

DIVISION OF ROAD MATERIAL TESTS AND RESEARCH
Prevost Hubbard, Chief.

Projects:

Administration

Mr. Reeve returned from his inspection at Palm Beach on April 10th.

Routine Tests and Analyses

During April, 25 samples were examined in the Chemical Laboratory, of which 17 were bituminous materials and 8 galvanized metal. 82 samples of rock, sand, gravel, etc., were examined in the Physical Laboratory and about that number were examined and classified in the Microscopic Laboratory.

Research Upon the Properties of Dust Preventives and Road Binders

Work on the relative binding value of various bituminous materials with different types of rock is now in such shape that results are being assembled for the preparation of a preliminary paper upon the subject.

The work on mixtures of soil with asphalt cements, which has been developed in the Chemical Laboratory during the past year, has been tried on a practical scale of operations in a local paving plant with the object of ascertaining if a thorough incorporation of the asphalt cement and soil could be accomplished in the type of mixer used for the preparation of sheet asphalt. No difficulty whatever was experienced in mixing 100 penetration asphalt with top soil which had not been previously heated. It is planned to lay a small section of this type of pavement at Arlington Farm early in May. A joint patent for the method of preparing such mixtures has been applied for by Messrs. Hubbard, Reeve, and Lewis, which patent, if issued, will be assigned to the Government.

Foundations have been placed for the experimental oil-refining plant in the building at Arlington Farm, and it is expected that the installation of the refining apparatus will be begun during the coming month.

The standardization of a cell for counting ultramicroscopic particles in solutions of bituminous materials is practically completed and it is hoped to issue a paper upon the subject in the near future.

Nonbituminous Road Material Investigations

A series of toughness tests has been made upon specimens of argillaceous road-building rock to determine the effect of alternate freezing and thawing upon such rocks. A preliminary report has been made upon this work, but the data does not at present permit of any definite conclusions being drawn.

The modification of the large impact machine for testing sections of brick pavement under impact, in order to determine the effect of various types of cushions and fillers, has been completed, and it is expected that a series of tests will be started along this line during May.

Department Bulletin No. 348 by Dr. E. C. E. Lord, upon the relation of mineral composition and rock structure to the physical properties of road materials, was issued on April 4. Upon request Dr. Lord prepared a paper summarizing this bulletin for publication in the May number of the American City, under the title "The Mineral Composition and Properties of Rock for Road Building."

Standardization of Methods of Testing

A meeting of Committee D-4 on Standard Tests for Road Materials of the American Society for Testing Materials was held at the Office of Public Roads on April 11. It is of interest to note that improvements devised in the Office on the penetration test with regard to a new standard needle, and the distillation test in connection with the condensing apparatus, were accepted by the Committee and will be recommended for adoption as standard by the Society this year.

A paper has been prepared by Messrs. Hubbard and Jackson upon the determination of the specific gravity of non-homogeneous aggregates by various methods. This paper includes a description of the different types of apparatus, together with comparative results obtained by their use. It will be presented before the American Society for Testing Materials at its annual convention the latter part of June. As a result of the investigation, the regular method for determining the specific gravity of rocks as described in Bulletin No. 347 has been superseded by a new method in which a 1000-gram sample of the broken rock is used, owing to the fact that much more accurate results can be obtained in this way.

On April 28 Mr. Goldbeck attended a meeting of Committee C-1 on Concrete Aggregates of the American Society for Testing Materials, which was held in Philadelphia.

Experimental Bituminous Road Construction and Maintenance

Mr. Reeve reports the successful development of the treatment recommended by the Office for the construction of oil-coralline rock roads in Palm Beach County, Florida. The general method consists in scarifying and reshaping the old coralline rock road, patching all holes, and bringing it to a uniform width of 15 feet with new rock. The wearing course of rock, consisting of washed and screened run of crusher material that passes a $2\frac{1}{2}$-inch screen and is retained on a $1\frac{1}{2}$-inch screen is spread to a depth of 3 inches over the prepared foundation. This course is lightly rolled to shape and then treated with a heavy residual asphaltic petroleum applied by means of a pressure distributor at the rate of about 1.1 gallons per square yard. The application is covered with fine roadside sand and lightly rolled. Final heavy rolling is done the next day.

Concrete Laboratory

During the month of April the forms and reinforcing steel have been prepared for the casting of another large slab at the Arlington laboratory. This slab is the largest one of the series, and is to be 32 feet wide, 16 feet span, and 16

es total thickness. The estimated breaking load concentrated at the center is 250,000 pounds. It is the intention to determine the effect of the total width and the "effective width", also to secure data concerning the effect of thickness.

Another small slab 12 feet wide by 6 feet span and 5 inches thick has been cast and will be tested at the end of 28 days.

Owing to bad weather during the month, slow progress has been made in the construction of the supports and building for the soil-pressure investigations. Messrs. Goldbeck and Smith have spent a great deal of time in the development and calibration of a portable cell for determining soil pressures. This cell is about perfected and will be described in a paper to be presented at the annual meeting of the American Society for Testing Materials, to be held the latter part of June.

The investigation of the "flow" of concrete is being continued by Mr. Smith, and the results indicate that the flow of limestone concrete is greater than that of gravel concrete.

DIVISION OF ROAD ECONOMICS
J. E. Pennybacker, Chief.

Projects:

Statistical Investigations

All statistical information in regard to road mileage, revenues, and expenditures is practically complete and on file in this Office, and is now being compiled and tabulated. It is now proposed to have this information printed in five bulletins, four groups of states and one summary, instead of three or four bulletins as previously contemplated. The bulletin including the southern states will be in the hands of the printer by May 13.

Statistics in regard to automobile registrations and revenues for 1915 are completed and in the hands of the printer. This information will be issued as a circular of the Secretary's Office.

Lectures and Road Models

J. J. Tobin and A. L. Hooper have finished their itinerary on the Iowa Good Roads Train. This train started at Des Moines on March 20 and wound up at Marion, Iowa, on April 191. During this time lectures were delivered and models exhibited at 126 towns.

A. S. Brainard delivered an illustrated address before the New Hampshire Association in the W. C. T. U. Building, 522 Sixth Street, N. W., Washington, D. C., on April 10.

J. D. Fauntleroy delivered an illustrated address on April 22 and on two or three days during the week following at Lynch Station, Virginia, previous to bond election on May 8.

Traffic Studies

W. E. Rosengarten has completed the traffic studies in St. Louis County, Missouri, and is now collecting information for the statistical bulletin in that State.

County Economic Studies

The manuscript for the economic bulletin is completed and in the hands of the printer.

Experimental Convict Camp

The cost of food during the month of March was 17-1/7 cents per convict per calendar day, the lowest cost so far reported.

On March 20 the force assigned to camp duty was reduced from four to three convicts and the camp has since been operated with that number, which is less than 8 per cent of the total population.

Since the establishment of the camp, up to and including April 30, the total number of convict days was 4,363.

In this time there have been:

Sixteen Sundays, entailing a loss of 571 convict days or 14.0 per cent of the total.

Seven full days of bad weather, representing a loss of 245 convict days or 5.5 per cent of the total.

Thirteen convict days of sickness, a loss of 0.3 per cent.

Camp labor has involved a loss of productive work of 437 convict days, or 10.0 per cent of the total.

The total time lost for the various reasons has therefore been 29.8 per cent of the total number of convict days.

So far there have been no escapes or attempts to escape.

Camp management, to which is charged one-half of the salary and board of the deputy warden and the entire salary and board of the camp clerk and night watchman, has cost, since the establishment of the camp, $527.16, which is at the rate of 12.1 cents per convict-calendar day, or 17.2 cents per convict-work day.

DIVISION OF RURAL ENGINEERING

E. B. McCormick, Mechanical Engineer, Chief.

Projects:

Domestic Water Supply and Sewage Disppsal.

Plans have been completed for a farm water system which includes a hydraulic ram installation and a reinforced concrete standpipe and cooling tank.

In preparation: Farm water system involving a hydraulic ram, and covered reservoir.

Completed: Plans for farm sewage disposal plant, involving double septic tank with subsoil distribution.

The model sewage disposal plant at Bethesda, Maryland, is nearing completion.

The bulletin on Farm Water Systems, and Year Book article on Sewage Disposal on the Farm, are in progress.

Farm Structures

Because of other models being rushed through, work on the farmstead model, started some weeks ago, has been delayed.

Several barn plans which were started some time ago but laid aside because of other work are being pushed to completion.

Two designs for farmhouses are in course of preparation - one being traced. An architectural draftsman has been appointed to a temporary position to assist in this work.

Plans for two cheese factory plants for the Dairy Division, B. A. I., are being prepared.

The publication of a design for a small Southern farmhouse in the Weekly News letter of March 29, and mentioned in the public press, has brought to date over 3600 inquiries for working drawings.

Field Experiments

The final tests on the Mississippi Post Road were completed April 13, and the dynamometer wagon was shipped to Austin, Texas.

Final tests on the Texas Post Road are being made by A. M. Daniels, A.M.E.

The preliminary report for the Ohio Post Road has been completed, and the preliminary report for the Mississippi Post Road is in preparation. These two reports are to be included in the general report covering the traction work so far done by this Division, mentioned in last month's Field Letter.

Morgan Cilley, A.M.E., resigned on the 15th to accept a position in the Supervising Architect's Office, Treasury Department.

Thresher Explosions

This Division has been conducting investigations and experiments in cooperation with the Bureau of Chemistry looking toward the development of a fire extinguisher for use on threshing machines. A device has been designed and is now being tried out on threshing machines loaned for the purpose, at Arlington Farm, Virginia. Elmer Johnson, A.M.E., has been conducting the work; the results so far give evidence that the device will prove most efficient.

Draw-Bar Ratings of Power Tractors

A device for determining the draw-bar horsepower of tractors has been designed and submitted for consideration by a committee appointed at a recent meeting of representatives of tractor manufacturers held at this Office. E. B. McCormick, Chief of the Division, and representing the Office of Public Roads and Rural Engineering, is a member of the committee.

DIVISION OF DRAINAGE INVESTIGATIONS
S. H. McCrory, Chief.

Projects:

Administration

S. H. McCrory left Washington April 15 for Chillicothe, Missouri, where he was engaged for about ten days in making an examination of the lands overflowed by the Grand River; he also conferred with C. W. Okey, S.D.E., at Burlington, Iowa, in regard to the rating and testing of pumping plants in the Upper Mississippi Valley. Enroute to Washington, Mr. McCrory stopped at Owensboro, Kentucky, where he conferred, on April 28 and 29, with officials of the Panther Creek Drainage District and of the railroad companies interested in the reclamation of the lands included in that district.

D. L. Yarnell, D.E., relieved S. W. Frescoln, D.E., on April 13, in conducting the experiments at the Arlington Farm to determine the capacities of tile drains. During the remainder of the month, Mr. Frescoln assisted in editing reports in the Washington Office.

On several occasions recently, packages containing instruments and other Government property have been received in the Office from field employees of this Division in a damaged condition owing to improper packing. It is requested that in the future greater care be exercised in the shipping of instruments or any other articles to see that they are packed in a manner that will withstand rough handling in the mails or by express.

Farm Drainage

On April 4-6, O. G. Baxter, D.E., located some tile drains on the Page and Hart Farm at Swifton, Arkansas, and on the 10th and 11th, he ran levels over the proposed drains on the Lucy Farm at Witherspoon, Arkansas.

F. G. Eason, D.E., was engaged during the month in making inspections and surveys of tile drainage projects in South Carolina, and in writing reports.

J. R. Haswell, D.E., visited farmers and others interested in drainage, making surveys and giving advice relative to drainage problems, on a number of farms in New Jersey, Delaware and Maryland.

On April 21, Lewis A. Jones, D.E., made an examination of W. E. Jones' farm at Mileston, Mississippi.

In connection with the survey made by H. M. Lynde, S.D.E., on the Cotton Valley Farm at Tarboro, North Carolina, S. H. McCrory accompanied Mr. Lynde on April 4 on an inspection of the unusual soil conditions found on that farm to determine the

proper spacing of drains. On the 6th, Mr. Lynde staked out some tile drains on the Hillandale Farm at Durham, North Carolina.

F. F. Shafer, D.E., left Washington April 11 and made examinations of farms in West Virginia; later in the month, he made an inspection of the tile drainage experiment being carried out on the Burkhart Farm, McCracken County, Kentucky.

In the Field Letter for April 1, reference was made to the receipt of a report on the Pedigreed Seed Company Farm, Hartsville, South Carolina, by F. G. Eason. This should have been shown as being prepared by H. M. Lynde.

Reports Transmitted:

D 9 Southern Stock and Farming Company, Charleston Co., S. C., by F. G. Eason.
D 9 D. W. Alderman Farm, Clarendon Co., S. C., by F. G. Eason.
D 61 Ground Water Movements, W. E. Elsberry Plantation, Montgomery County, Ala., by Lewis A. Jones.

Reports Received:

D 8X Mrs. W. G. Gaither's Woodland Farm, Perquimans Co., N. C. by F. R. Baker*
D 9 Ashley Hall Plantation, Charleston Co., S. C., by F. G. Eason.
*Assistant Engineer, N. C. Dept. of Agriculture, cooperating with this Office.

Overflowed Land

On April 17-19, O. G. Baxter, D.E., made an inspection of the ditches in the Cypress Creek Drainage District, Arkansas.

On April 16, Lewis A. Jones, S.D.E., left Washington for the purpose of visiting projects in Alabama and Mississippi. On the 19th, he made a preliminary examination of Flint Creek in Morgan County, Alabama, and later conferred with landowners of the Luxapallila River Drainage District, Fayette and Lamar Counties, Alabama, in regard to the drainage plan of that district which has been submitted to the landowners.

After visiting farms in West Virginia, Fred F. Shafer, D.E., proceeded on April 15 to Portland, Indiana, where he made a preliminary examination of Salamonia River. From there, he proceeded to the Mayfield Creek Drainage District, Kentucky, and conferred with persons interested in its drainage.

W. N. Hall, D.E., arrived at Chillicothe, Missouri, from Salt Lake City, Utah, on April 25 to make a survey of the lands overflowed by the Grand River.

The Cypress Creek Drainage District, Arkansas, has recently sold additional bonds amounting $700,000. The Court has confirmed the recently-elected Board of Commissioners and, as this district is working in conjunction with several levee districts, there is every indication that the construction work will be carried forward to completion.

Reports Transmitted:

D 9 Tillman Bottoms on Wilson Creek, Greenwood Co., S. C., by F. G. Eason.
D 9 Marshall Bottoms on Wilson Creek, Greenwood Co., S. C., by F. G. Eason.
D 10-O Rose Creek, Oconee Co., Ga., by J. V. Phillips.
D 18 Boyer River Lowlands, Sac Co., Iowa, by F. F. Shafer.
D 18-B Monona-Harrison Drainage District, Monona and Harrison Counties, Iowa, by D. L. Yarnell.
D 25 Covington Drainage District, Tipton Co., Tenn., by O. G. Baxter.
D 26-C Luxapallila River Drainage District, Fayette and Lamar Counties, Ala., by L. A. Jones.
D 32 Colorado River, Texas, by O. G. Baxter.
D 41 Duvall Drainage District, Duvall, Washington, by W. A. Kelly.

Irrigated Land

Reports Transmitted:

D 22-H Hershey Drainage District, Lincoln Co., Nebraska, by D. G. Miller and L. T. Jessup.
D 35 J. H. Montgomery Farm, Big Horn Co., Wyoming, by D. E. Heizer.

Reports Received:

D 37-D San Juan Indian School, San Juan Co., N. M., by D. G. Miller and G. A. Hart.
D 39-A Smedley Beazer Tract, Syracuse, Utah, by R. A. Hart.
D 39-A Smithfield Tract No. 3, Smithfield, Utah, by R. A. Hart.
D 39-A Iowa Drainage District, Bear River Valley, Utah, by R. A. Hart
D 39-A Utah-Idaho Sugar Company Tracts, Bear River Valley, Utah, by R. A. Hart.
D 39-A Criddle Farm, Clearfield, Utah, by W. N. Hall and G. A. Hart.
D 39-A Dr. T. B. Beatty Farm, Cropley, Utah, by R. A. Hart.
D 39-A Bassett Tract, Clearfield, Utah, by R. A. Hart.
D 39-D Lake Shore Drainage District, Lake Shore, Utah, by R. A. Hart.

Swamp Land

On April 2, J. V. Phillips, D.E., left Washington for the purpose of making an investigation in cooperation with the Georgia Geological Survey to determine the location and area of swamp and overflowed lands in that State.

H. M. Lynde, S.D.E., commenced a reconnaissance survey of Caw Caw Swamp and Scippio Swamp in Brunswick County, North Carolina, on April 18.

Reports Received:

D 10 Evans Tract, Washington County, Ga., by Quincy C. Ayres.

Construction, Operation, and Maintenance of Drainage Improvements

On April 19, C. W. Okey, S.D.E., left New Orleans for the purpose of rating and testing pumping plants in the Upper Mississippi Valley. Dan S. Helmick, J.D.E., will assist Mr. Okey in making these investigations.

DIVISION OF IRRIGATION INVESTIGATIONS
Samuel Fortier, Chief.

Projects:

Administration

Mr. Fortier left on his western inspection trip April 27. He expected to attend a meeting of a sub-committee of the American Society for Testing Materials April 29, the committee work having to do with the standardization of specifications for drain tiles. From Chicago he proceeded to Denver, and from there planned to follow the itinerary outlined in the March Field Letter. He is expected back in Washington about May 15.

F. L. Bixby, I.E., following a brief conference in Washington with Mr. Page and Mr. Fortier, proceeded to Reno, Nevada, where he arrived April 10 to take charge of the duty of water and pumping experiments to be carried on this year with the State University and the State Engineer. Mr. Bixby's headquarters are at Reno, although the investigations to be undertaken will include several of the representative valleys of the State.

Ralph L. Parshall, who has been employed in the cooperative experiments at the Fort Collins laboratory for the past three years, has been appointed Assistant Irrigation Engineer, having passed the examination for that position held last September. His present detail at Fort Collins will continue indefinitely.

A report on Irrigation in Porto Rico has been received from A. T. Mitchelson, I.E., this being based mainly on Mr. Mitchelson's experience in the work of the Porto Rican Reclamation Service prior to his transfer to this Office.

The Berkeley Office is cooperating informally with the State Rural Credit and Land Colonization Commission, the Division of Rural Institutions in the University of California, and the Commonwealth Club of California in a study of land settlement conditions in California, the investigation being jointly under the direction of Dr. Elwood Mead of the University of California, Prof. David N. Morgan, Secretary of the State Rural Credit and Land Colonization Commission, and Frank Adams, I.M.

O. W. Israelsen, who has been connected with the Irrigation Investigations in California for three years, although carried on the salary roll of the University of California, has resigned to become head of the college work in irrigation in the Utah Agricultural college, where he will also have investigational work in the Experiment Station.

Utilization of Water

A report on the Irrigation of Small Fruits, by Wells A. Hutchins, Assistant in Irrigation Economics, has been completed at the Berkeley Office and submitted to Washington. This report deals entirely with California practice, and will probably be published by the University.

The bulletin on Experiments on the Economical Use of Irrigation Water in Idaho, by Don. H. Bark, which has been at the printing office for several months, was published April 21 and is now being distributed.

Negotiations are in progress with the Imperial Valley, California, Agricultural Assembly, looking to a study of methods of handling silt in that valley. If undertaken, the investigation will have for its object the development of methods of handling waters heavily charged with silt so as to reduce or prevent the silting of canals; the development of formulas and tables for the design of canals for this purpose; and the development of methods of removing silt from canals where it is not practicable to prevent its deposit. The work proposed would constitute an extension of studies already begun by C. E. Tait, I.E., field work for which is about to be started by Mr. Tait and F. J. Veihmeyer, A.I.E. The Office would expect to detail several engineers to the investigation in case it were undertaken, a similar force being supplied by the Agricultural Assembly.

Flow of Water

S. T. Harding, I.E., and R. B. Sleight, A.I.E., appear among the contributors to the discussion of the paper by G. H. Ellis published in the proceedings of the American Society of Civil Engineers and noted in last month's Field Letter. Mr. Ellis' paper was based on the data presented in Dept. Bul. 194, Flow of Water in Irrigation Channels, by F. C. Scobey, I.E. Other contributors to the discussion are H. B. Muckleston, Harold F. Gray, and Allen Hazen. Their letters appear in the April Proceedings of the Society.